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EDITORIAL

The Geographical and Economical Impact of Scrub Typus, the Fastest-growing Vector-borne Disease in Korea

Scrub typus, or Tsutsugamushi disease is a vector transmitted infectious and febrile illness caused by "Orientia tsutsugamushi" bacteria. It is transmitted to humans through larvae bites of different species of trombiculid mites. The habitat of mites is located in low trees and bushes. However this vector can live in many different areas even in sandy and mountain desert [1].

In 1985, infected people appeared again [2]. Since then Scrub typhus incidences have been reported every year. Now it is considered as one of the most prevalent diseases affecting humans Korea especially in the southwestern provinces of the country [3]. Usually, the larvae of mites feed on wild rats and the human gets infected accidentally in a zone of infected mites. The chance of outbreak of this disease depends on the number of contacts between the human and the mites. Hence the habitats of mites and the human activities are the key factors in the *Scrub typus* prevalence. Human activities include war, farming, camping, urbanization and so on. A study on the epidemiological characteristic of this disease in Korea supports this general notion [4].

Chigger population densities were great in areas with high relative humidity, low temperature, low incident sunlight and a dense substrate vegetative canopy [5]. The relationship between human incidence of scrub typhus and climate should largely reflect the responses of chiggers to the environment [6].

The occurrence of scrub typhus is also related to land uses such as urbanization and developing cornfield and bio-fuel productions and oil palms [7]. The replacement of natural forests with plantations at forest fringe facilitated the establishment of the disease, providing the best habitats for the mite [8]. Malaysia has seen an increasing incidence of scrub typhus which is directly related with large-scale cultivation of oil palm and rubber [9]. Urbanization means that the habitats of mites and the life style of human are changing. The contact rate of human with wild life is getting higher. We need information of the habitats of mites and the human activities. Also the incidences of the scrub typhus could be also influenced by climate change in Korea [10].

The geographical information is quite important to trace and predict the occurrence of *Scrub typhus* in spatial respect. It is valuable to use the geographic information system (GIS) method to help the analysis of the occurrence trend. It is widely used in the management of vector-borne disease and human health [11–13]. GIS method can be useful to evaluate the habitat of wildlife [14,15]. Recently it is applied to spatial analysis of scrub typhus [16].

The infected persons of *Scrub typus* increased more than three times during the period 2001–2012. The prevalence of this disease in Korea has been on a steady rise over the past years. As pointed out by WHO, the reason for such high prevalence of *Scrub typus* is due to climate change. The major methods used to estimate the loss caused by diseases is contingent valuation [CV] method that encompasses all the implicit values. Diener, O'Brien & Gafni [1998] compared research results based on CV while Yen, et. al. [2007] estimated the value of vaccine that blocks the infection of SARS in Taiwan [17,18]. Krupnick, et. al. [2002] analyzed the loss of value caused by death-causing diseases in Ontario, Canada [19]. Alberini, Hunt & Markandya [2006] estimated WTP for value of a statistical life in EU countries such as the UK, Italy and France [20]. The

CV method was used for the social loss value of avian influenza, zoonoses in Korea [21–23].

In this issue, Jin et al. have analyzed the spatial pattern of the occurrence of scrub typhus in Korea using the data from the Korea Centers for Disease Control and Prevention. And the correlation with occurrence of scrub typhus and land use change is studied. The authors concluded that the Gangwon Province and Gyeongsangbuk Province show low incidence number all through the year. Some districts have almost identical environmental condition of *Scrub typus* incidence. The land use change of districts does not affect directly the incidence rate. GIS analysis shows spatial characteristics of *Scrub typus* [24].

Rhee has adopted the climate change in the incidence of *Scrub typus* in Korea. This research can be used to construct spatial-temporal model to understand the epidemic *Scrub typus*. Double Bounded Dichotomous Choice of Contingent Valuation method is used to estimate Willingness to Payment to avoid infection of this disease, through the survey in the patient group and the control group The younger the age of the family is, the higher the level of awareness on risks caused by climate change, men, the higher the income is, the lower the suggested bid is, the higher WTP is to avoid infection of disease. The means of the amount of WTP are estimated to be 3,689 KRW per month. As people have become increasingly aware of climate change diseases, WTP to avoid infection of *Scrub typus* has increased accordingly. And the implicit loss of value due to climate change diseases is increasingly becoming higher. Therefore, there should be stronger and more aggressive promotional activities recommended [25].

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